

IN THE CLAIMS:

Claims 1-5 (Canceled)

Claim 6 (Original): A fuel injector having a fuel inlet, a fuel outlet, and a fuel passageway extending from the fuel inlet to the fuel outlet along a longitudinal axis, the fuel injector comprising:

- a body having an inlet portion, an outlet portion, and a body passage extending from the inlet portion to the outlet portion along the longitudinal axis;
- an armature proximate the inlet portion of the body;
- a needle operatively connected to the armature;
- a swirl generator proximate the needle;
- a seat disposed at the outlet portion of said body, the seat including a first surface exposed to the body passage and a second surface exposed to an exterior of the fuel injector, the first surface being spaced from the second surface a defined distance along the longitudinal axis, the first portion having at least one cut-out configuration that extends from the first surface for a fraction of the defined distance into an interior of seat.

Claim 7 (Original): The fuel injector of claim 6, wherein the at least one cut-out comprises at least one volume that defines at least one wall in the interior of the seat.

Claim 8 (Original): The fuel injector of claim 7, wherein the at least one volume comprises one of a plurality of volumes and a channel.

Claim 9 (Original): The fuel injector of claim 8, wherein the swirl generator comprises at least one flat disk;

- wherein the seat includes a seat passage, the seat passage including a funnel extending between the first surface and the second surface; and

- wherein the needle includes a curved surface that engages with a conical end of the funnel to inhibit fuel flow through the seat passage of the seat.

Claims 10-19 (Canceled)

Claim 20 (Original): A method of stabilizing temperature of a fuel injector in a direct injection application, the fuel injector having a body; an armature proximate an inlet of the body; a needle operatively connected to the armature; a seat disposed at the outlet of the body; and a swirl generator proximate the seat, the method comprising:

providing the needle with a substantially uniform cross-sectional area; and

selecting the body to surround the needle and form a body passage, the body passage maintains an operative relationship between the body and the needle;

wherein fuel in the body passage transfers heat from the body to the needle to maintain a minimum temperature gradient and to maintain an operative relationship between the body and the needle.

Claim 21 (Original): The method of claim 20, wherein the average cross-sectional area of the body passage is less than 2.25 times the substantially uniform cross-sectional area of the needle.

Claim 22 (Original): The method of claim 20, wherein the step of providing further comprises providing a substantially cylindrical member as the needle, and a cylindrical annulus as a neck of the body, the cylindrical annulus having an inner diameter that is no more than 50% greater than substantially uniform diameter of the substantially cylindrical member, and an outer diameter that is no less than 100% greater than the inner diameter.

Claim 23 (Original): The method of claim 22, further comprising:

providing the seat with a first surface exposed to the fuel passageway and a second surface exposed to an exterior of the fuel injector; and

configuring at least one cut-out in the first surface to form a wall that extends into an interior of seat.